UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE RO

REPLY TO: 3430 Evaluation

DATE: March 26, 1985

SUBJECT: Biological Evaluation of Grasshopper Potential At McCormick Meadows, Calaveras Ranger District (Report No. 85-15)

TO: Forest Supervisor, Stanislaus National Forest

At the request of Blaine L. Cornell, Stanislaus National Forest Supervisor, pine plantations at McCormick Meadows were evaluated to assess the potential for further grasshopper damage. The evaluation was done on February 13, 1985, by Dave Schultz, Entomologist, from the FPM Staff. Duncan Wurm, Culturist on the Calaveras Ranger District, made arrangements for an over-snow vehicle and assisted, along with several other District personnel, with the evaluation.

Introduction

The McCormick Meadows plantation totals 160 acres and consists of 10 units ranging from 7 to 43 acres in size. The units resulted from understocking of stands during the 1976-77 drought and also from brushfield conversion. The units are distributed along Road 4N03 between the North and Middle Fork of the Stanislaus River at elevations ranging from 3,200 to 4,400 feet. After fairly intensive site preparation, the area was planted with ponderosa pine in the spring of 1983. High populations of grasshoppers were noted in July, 1983 and by September there was some seedling mortality in the lower elevation units. An insecticide treatment to reduce grasshopper populations was planned for 1984 but did not occur for a variety of reasons. By May of 1984, several of the lower elevations units were at, or below, the minimum stocking needed to carry the plantation.

Observations and Discussions

The upper elevation units were planted with large 2-0 stock which are now entering their fifth growing season. These seedlings are now generally too large to allow grasshoppers to cause heavy mortality. There is a fairly contiguous grass cover which will slow the growth of the trees. The grass will also harbor grasshoppers which will clip some foliage and further slow tree growth. Grasshopper feeding was not a major factor in the current seedling mortality examined. All the dead seedlings were J-rooted in spite

of auger planting and some were also trampled by cattle. No live seedlings were excavated to examine their root condition. Although average stocking is probably above the minimum necessary, it would be prudent to examine the roots on some live seedlings before deciding to carry these units. Seedlings will not outgrow a J-root and the survivors will cause future problems.

The mid-elevation units have excellent survival and stocking. There was some slight grasshopper feeding which occurred primarily on sugar pine, but this was far outweighed by the level of cattle damage. Grass and forbs are just beginning to invade these units. The vegetation will slow the growth and provide grasshopper habitat. The seedlings in these units are small enough that they will remain susceptible to being killed by grasshoppers for at least another year or two. It would probably pay to monitor for high grasshopper populations to avoid the sudden loss of these successfully regenerated units.

Grasshoppers and competition from heavy grass cover have killed almost all of the seedlings in the lower units. There are a few pockets of seedlings left, but their future does not appear very promising without vegetation control. Some form of vegetation control would also be necessary to establish any new seedlings on the site. The use of mechanized equipment for vegetation control on these units is unlikely due to thin soil, steep slopes and stumps. Seedlings could probably be re-established by hand scalping and planting. They would have to be protected from cattle and deer by Vexar tubing. Because the grasshopper habitat would not be altered, grasshopper populations would have to be suppressed by hand baiting or spraying of insecticide for at least 3 seasons until the trees are too large to be killed outright. Because of a large investment in the early years of the plantation and anticipated slow growth due to competing vegetation, it might be difficult to recover the investment.

A thorough discussion of grasshopper effects on plantations and management alternatives available appears in Report No. 85-05. The management alternatives listed below are a synopsis of those relevant to the units examined.

Management Alternatives for Upper Elevation Units.

1. Do nothing. Few seedlings will die from grasshopper feeding because most are already too large. If few live seedlings are J-rooted, a minimally to adequately stocked stand will result. If a significant portion of the seedlings are J-rooted, they will not produce a satisfactory stand and will cause continual problems until they die.

2. Inspect seedlings. The high proportion of dead seedlings with J-roots suggests there may also be live seedlings with the same condition. Excavating a sample of live seedlings would further

lower the stocking but would give some indication of whether the current stock is worth any further investments.

3. Vegetation management. If an inspection shows that the current stock is worth saving, control of the vegetation would increase growth rate and vigor. To the extent that deer, cattle, gopher and grasshopper habitat is reduced, it may increase survival.

Management Alternatives for Mid-Elevation Units.

1. Do nothing. If grasshopper populations build during the next few years, they will cause extensive losses in these currently fully stocked units. If grasshopper numbers remain low, the encroaching vegetation will slow seedling growth and may make them more susceptible to other pests.

2. Monitor plantation. Monitoring during May and early June could detect high grasshopper populations and allow time for control before extensive losses occur. Because the seedlings in these units are smaller than those in the upper units and also because the vegetation begins to dry earlier, they will remain vulnerable to being killed by grasshoppers for a longer period of time.

3. Kill grasshoppers. If high populations of grasshoppers are detected, they can be controlled with insecticide sprays or baits. A single application is generally more economical in a well stocked plantation than the cost of replacement. If several insecticide applications are anticipated before the seedlings become too large to be killed by grasshoppers, it may change the economic picture considerably.

4. Vegetation management. Control of competing vegetation would increase the growth rate of the seedlings, reduce the length of time they are susceptible to grasshoppers and reduce habitat for several organisms which could damage the seedlings.

Management Alternatives for Lower Elevation Units.

1. Do nothing. Conifers will not recapture the site for at least several decades. Gophers will invade the site fairly rapidly. Brush will eventually gain control of the area. Once brush shades out the grass, a few scattered confiers will seed in. Artificial regeneration will become progressively more difficult with the passage of time.

2. Manage units for range. This might allow some targets to be met with little further input. Some conflicts with wildlife resources could occur.

3. Kill grasshoppers with insecticide. If conifers were established, they could be protected from grasshopper feeding by the use of insecticides. It would be possible to keep most seedlings alive until they were too large to be killed by grasshoppers in

spite of abundant grasshopper habitat. Substituting three or more insecticide treatments for effective vegetation management would be expensive, would not comply with the principles of integrated pest management and generally would not be an efficient allocation of resources unless there are additional values or constraints involved.

4. Manage vegetation. Some sort of vegetation control would be necessary just to establish conifer regeneration. On these low elevation units, fairly intensive vegetation control will be needed for several years to prevent stress from the vegetation or damage from organisms using the vegetation for habitat. Repeated entries using hand labor could make these units very expensive sites on which to grow conifers.

If you need additional information or would like to discuss this evaluation, please contact Dave Schultz on my staff; (415-556-4322).

/s/Wilfred L. Freeman, Jr.

WILFRED L. FREEMAN, JR., Director
Forest Pest Management